

DATSUN 280ZX Model S130 Series



SECTION ST

STEERING SYSTEM

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CAUTION:

- a. Never in any case should extra loads be applied to steering column in axial direction.
- b. When installing steering wheel, apply tightening torque of 4.0 to 8.0 kg-m (29 to 58 ft-lb).

Note: When a new steering wheel is installed, after installing steering wheel, turn it clockwise and counterclockwise to check for catch or free play. A free check for operation. If the steering wheel has a free play, the steering wheel should be dismantled, and if necessary, replace it as an assembly.

REMOVAL

1. * I.P.S. model.
Remove bolt securing nut and rubber coupling.

CAUTION:

Do not strike end of steering column shaft with a hammer. Striking shaft will damage bearing or column shaft.

Manual steering gear
Remove steering wheel. Refer to Steering Wheel.

INSTALLATION

1. Remove steering wheel in the reverse order of removal. Drive the following instructions.
2. Apply grease to the steering shaft in a straight tight position. Lubricate the shaft on the upper support bracket in that direction.

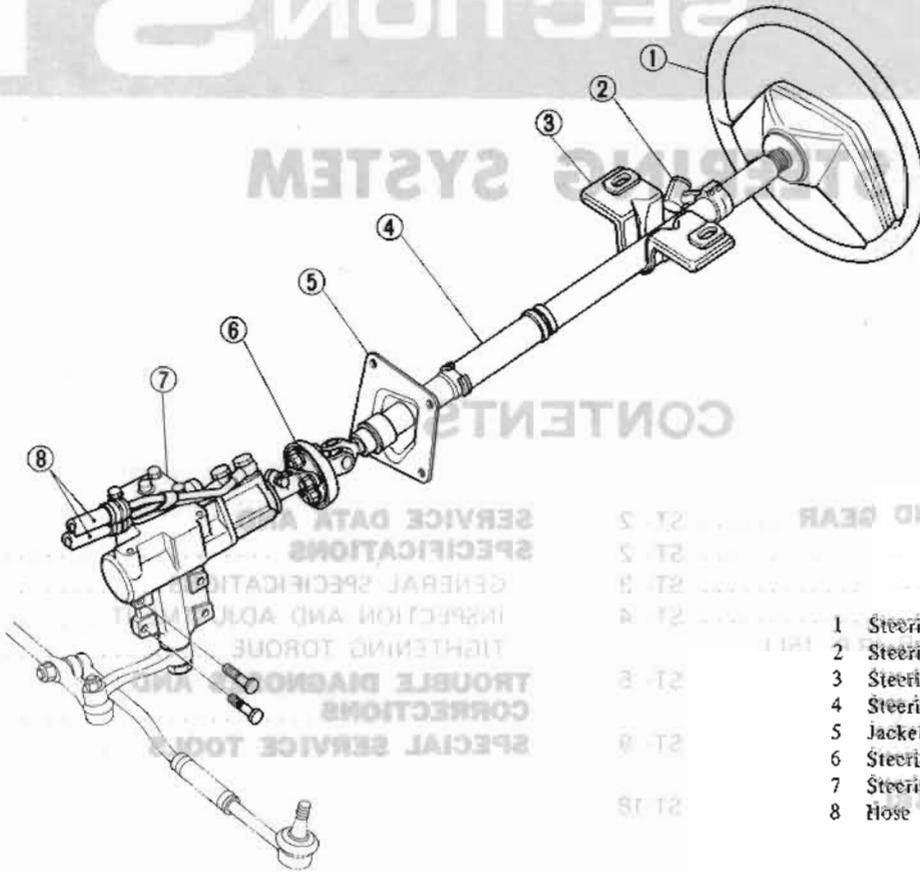
STEERING WHEEL REMOVAL

1. Disconnect battery ground cable.
2. Remove bolt and nut.
3. Remove steering wheel nut.
4. Remove steering wheel using Wheel Puller ST2180001.

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STEERING COLUMN AND GEAR



- 1 Steering wheel
- 2 Steering lock assembly
- 3 Steering column mounting bracket
- 4 Steering column assembly
- 5 Jacket tube bracket assembly
- 6 Steering column coupling
- 7 Steering gear assembly
- 8 Hose

ST829

Fig. ST-1 Steering Column and Gear

STEERING WHEEL

REMOVAL

1. Disconnect battery ground cable.
2. Remove horn pad.
3. Remove steering wheel nut.
4. Remove steering wheel using Steering Wheel Puller ST27180001.



Fig. ST-2 Removing Steering Wheel

CAUTION:

Do not strike end of steering column shaft with a hammer. Striking shaft will damage bearing or column shaft.

- Ⓣ Tightening torque:
Steering wheel nut
4.0 to 5.0 kg-m
(29 to 36 ft-lb)

Note: After installing steering wheel, turn it clockwise and counterclockwise, checking for catch or drag. Also check horn for operation.

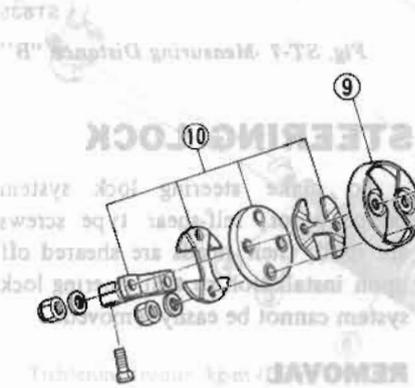
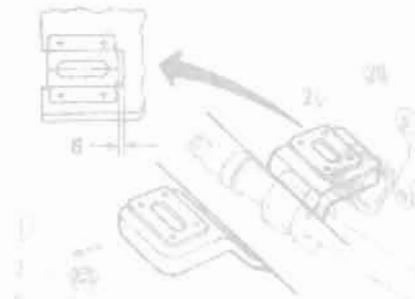
INSTALLATION

Install steering wheel in the reverse order of removal. Observe the following instructions.

1. Apply grease to sliding portions.
2. Install steering wheel on column shaft in a straight ahead position after facing punch mark on the top of upper column shaft in that direction.

STEERING COLUMN

After installation, make sure that steering wheel turns smoothly.



REMOVAL
1. Break off shear type screws with a drill or other appropriate tool.
2. Remove screws and dismount steering lock.

CAUTION:

- a. Never in any case should undue stress be applied to steering column in axial direction.
- b. When installing, do not apply bending force to steering column.

Note: When a head-on collision is encountered, inspect steering system as follows:

The steering system is very important unit for driving. The collapsible type steering column should not be disassembled, and if necessary, replace it as an assembly.

REMOVAL

- 1. ● I.P.S. model;
Remove bolt securing stub shaft and rubber coupling.

INSPECTION

When steering wheel can not be rotated smoothly, check the steering column for the following pattern and replace faulty parts.

- (1) Check column bearings for damage and replace if so, lubricate with recommended multi-purpose grease.
- (2) Check jacket tube for distortion or breakage and replace with a new steering column assembly.
- (3) Check jacket tube for looseness or weakness.
- (4) Check column grease level and top up if necessary.

Tightening torque kg-m (ft-lb)

- A : 4.0 to 5.0 (29 to 36)
- B : 0.35 to 0.45 (2.5 to 3.3)
- C : 1.7 to 2.0 (12 to 14)
- D : 1.3 to 1.8 (9 to 13)

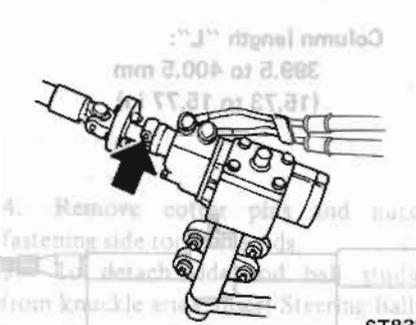
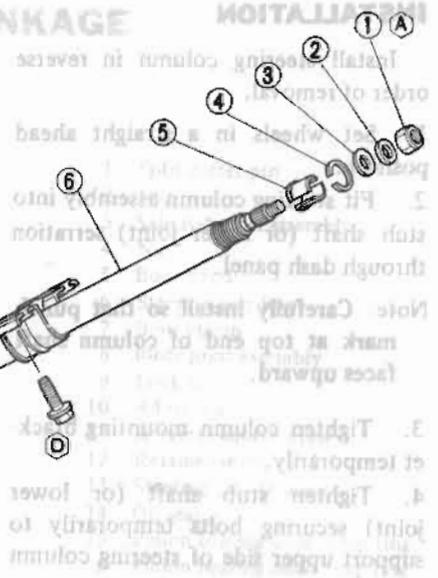


Fig. ST-4 Stub Shaft Securing Bolt

- Manual steering model;
Remove bolt securing lower joint and rubber coupling.
- 2. Remove steering wheel. Refer to Steering Wheel.
- 3. Remove steering column shell covers.
- 4. Remove combination switch assembly.
- 5. Remove jacket tube bracket and jacket tube bracket cover from dash panel.
- 6. Remove column mounting bracket.



- 1 Steering wheel fixing nut
- 2 Spring washer
- 3 Washer
- 4 Collar wire
- 5 Steering wheel collar
- 6 Steering column assembly
- 7 Column mounting bracket
- 8 Jacket tube bracket
- 9 Heat shield plate
- 10 Coupling

Fig. ST-3 Steering Column

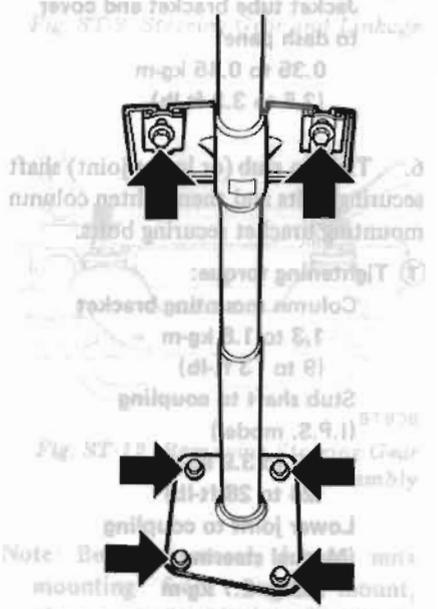


Fig. ST-5 Jacket Tube Bracket and Column Mounting Bracket Securing Bolts

- 7. Draw out steering column assembly from the room side.

INSTALLATION

Install steering column in reverse order of removal.

1. Set wheels in a straight ahead position.
2. Fit steering column assembly into stub shaft (or lower joint) serration through dash panel.

Note: Carefully install so that punch mark at top end of column shaft faces upward.

3. Tighten column mounting bracket temporarily.
4. Tighten stub shaft (or lower joint) securing bolts temporarily to support upper side of steering column assembly.
5. After sliding jacket tube bracket to dash panel, tighten nuts to retain it.

CAUTION:

- a. Make sure that undue stress is not applied to rubber coupling.
- b. To avoid damaging bolt or serrations, align groove in worm shaft with bolt hole in rubber coupling.

Tightening torque:

Jacket tube bracket and cover to dash panel
0.35 to 0.45 kg-m
(2.5 to 3.3 ft-lb)

6. Tighten stub (or lower joint) shaft securing bolts and then tighten column mounting bracket securing bolts.

Tightening torque:

Column mounting bracket
1.3 to 1.8 kg-m
(9 to 13 ft-lb)

Stub shaft to coupling (I.P.S. model)

3.3 to 3.9 kg-m
(24 to 28 ft-lb)

Lower joint to coupling (Manual steering model)

2.3 to 2.7 kg-m
(17 to 20 ft-lb)

7. Install steering wheel. Refer to Steering Wheel.

8. After installation, make sure that steering wheel turns smoothly.

INSPECTION

1. When steering wheel can not be rotated smoothly, check the steering column for the following matters and replace faulty parts.

- (1) Check column bearings for damage or unevenness. If so, lubricate with recommended multi-purpose grease or replace with a new one as steering column assembly.
- (2) Check jacket tube for deformation or breakage, and replace if necessary.
- (3) Check column spring, and replace if damaged or weakened.

2. When the car comes into light collision, check the following parts and replace if necessary.

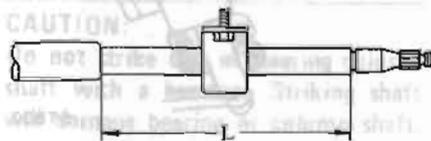
(1) Jacket tube

Measure dimension "L".

When jacket tube is crushed, dimension "L" is reduced.

Column length "L":

399.5 to 400.5 mm
(15.73 to 15.77 in)



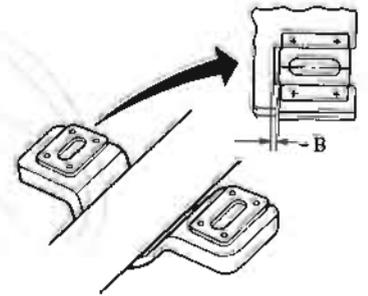
ST834

Fig. ST-6 Standard Dimension on Collapsible Column

(2) Column mounting bracket
Make sure column mounting bracket touches block.

Measure distance "B" as shown in

Fig. ST-7. Standard distance "B" is 0 mm (0 in). When jacket tube is crushed, distance "B" becomes larger.



ST835

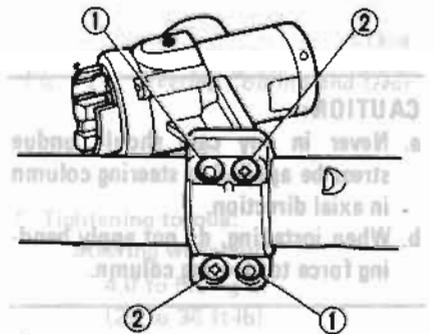
Fig. ST-7 Measuring Distance "B"

STEERING LOCK

To make steering lock system tamper-proof, self-shear type screws are used; their heads are sheared off upon installation so that steering lock system cannot be easily removed.

REMOVAL

1. Break self-shear type screws with a drill or other appropriate tool.
2. Remove screws and dismount steering lock.



- 1 Self-shear type screw
- 2 Screw

ST650

Fig. ST-8 Removing Steering Lock

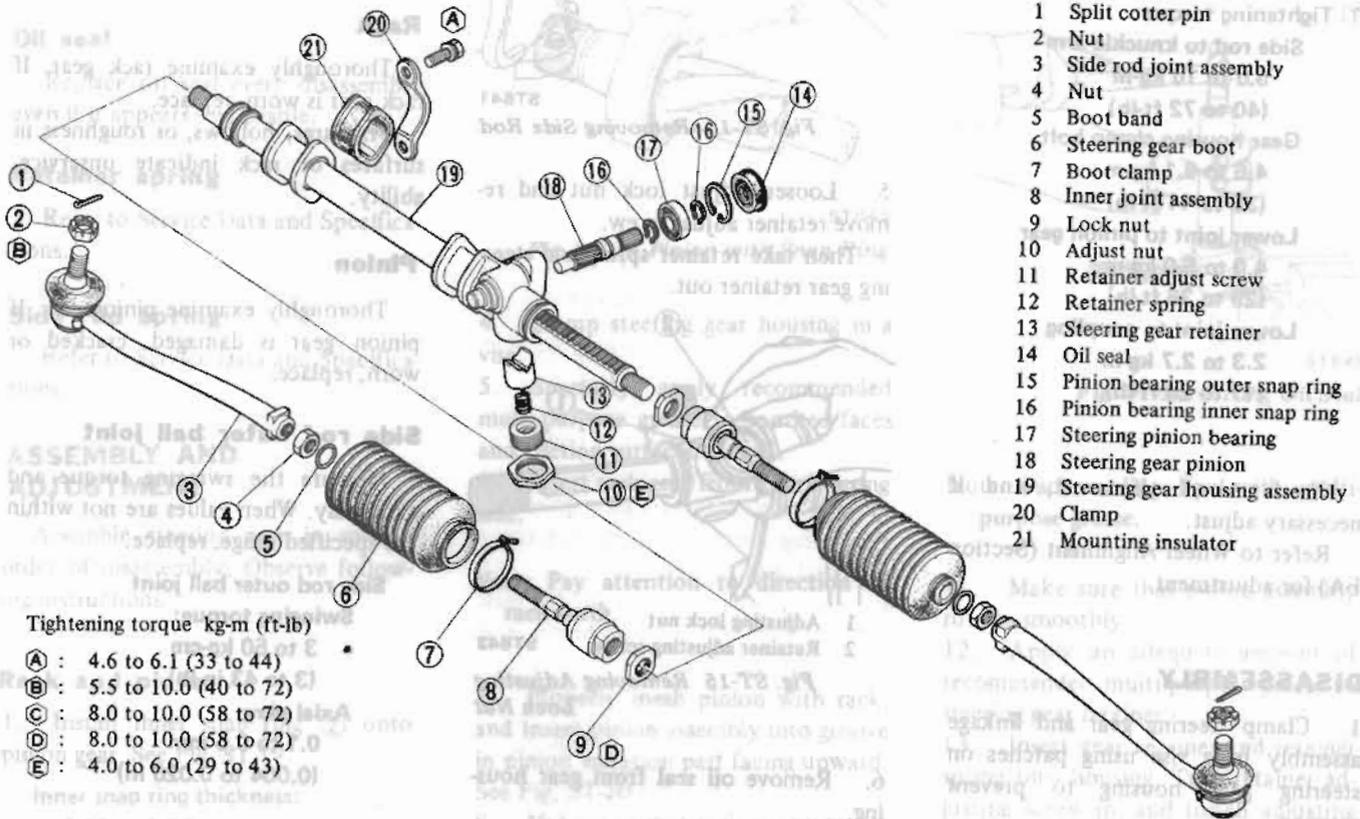
INSTALLATION

1. Align steering lock hole in jacket tube with mating portion of steering lock.
2. Install self-shear type screws and cut off their heads.

REMOVAL

1. I.P.S. model.
Remove bolt securing and rubber coupling.

MANUAL STEERING GEAR (R.P. 15L) AND LINKAGE



- 1 Split cotter pin
- 2 Nut
- 3 Side rod joint assembly
- 4 Nut
- 5 Boot band
- 6 Steering gear boot
- 7 Boot clamp
- 8 Inner joint assembly
- 9 Lock nut
- 10 Adjust nut
- 11 Retainer adjust screw
- 12 Retainer spring
- 13 Steering gear retainer
- 14 Oil seal
- 15 Pinion bearing outer snap ring
- 16 Pinion bearing inner snap ring
- 17 Steering pinion bearing
- 18 Steering gear pinion
- 19 Steering gear housing assembly
- 20 Clamp
- 21 Mounting insulator

Tightening torque kg-m (ft-lb)

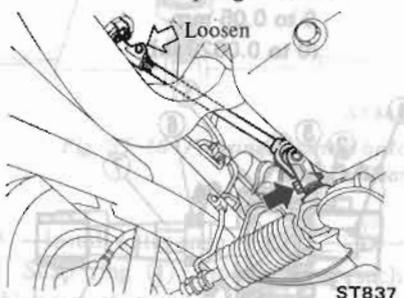
- A : 4.6 to 6.1 (33 to 44)
- B : 5.5 to 10.0 (40 to 72)
- C : 8.0 to 10.0 (58 to 72)
- D : 8.0 to 10.0 (58 to 72)
- E : 4.0 to 6.0 (29 to 43)

ST836

Fig. ST-9 Steering Gear and Linkage

REMOVAL

1. Jack up front of car and support it with safety stand.
2. Loosen bolt securing lower joint shaft to rubber coupling.



ST837

Fig. ST-10 Removing Lower Joint from Pinion

4. Remove cotter pins and nuts fastening side rod ball studs.
5. To detach side rod ball studs from knuckle arms, insert Steering Ball Joint Remover HT72520000 between them and separate them.

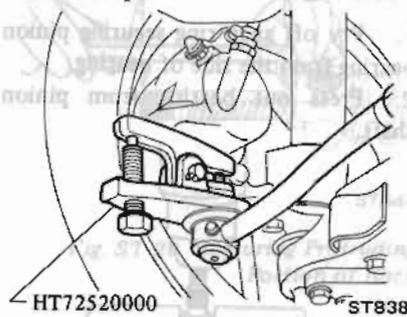
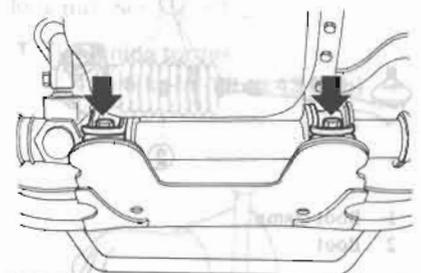


Fig. ST-11 Removing Ball Joint

6. Remove bolts securing steering gear housing to suspension cross-member.



ST839

Fig. ST-12 Removing Steering Gear Assembly

Note: Before removal, loosen nuts mounting front engine mount, place a wooden block under oil pan and jack up so that front engine mount is raised by 10 to 15 mm (0.39 to 0.59 in).

3. Disconnect bolt securing lower joint to steering pinion gear and then draw out lower joint from steering pinion gear.

7. Remove steering gear and linkage assembly from car.

INSTALLATION

Install steering gear and linkage in reverse order of removal.

Observe the following instructions:

Tightening torque:

Side rod to knuckle arm

5.5 to 10 kg-m

(40 to 72 ft-lb)

Gear housing clamp bolt

4.6 to 6.1 kg-m

(33 to 44 ft-lb)

Lower joint to pinion gear

4.0 to 5.0 kg-m

(29 to 36 ft-lb)

Lower joint to coupling

2.3 to 2.7 kg-m

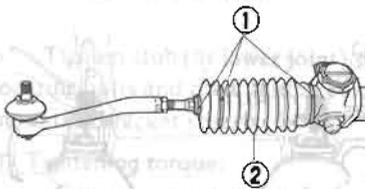
(17 to 20 ft-lb)

Check wheel alignment, and if necessary adjust.

Refer to Wheel Alignment (Section FA) for adjustment.

DISASSEMBLY

1. Clamp steering gear and linkage assembly in a vise using patches on steering gear housing to prevent scarring.
2. Remove boot clamps from steering gear boots. (Both left and right)



- 1 Boot clamp
- 2 Boot

ST840

Fig. ST-13 Removing Clamp

3. Loosen inner joint lock nut.
4. Remove side rod assembly from rack.

CAUTION:

Do not disassemble inner joint assembly and side rod socket assembly.

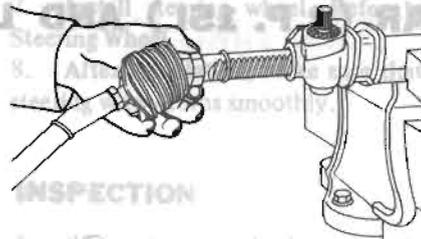
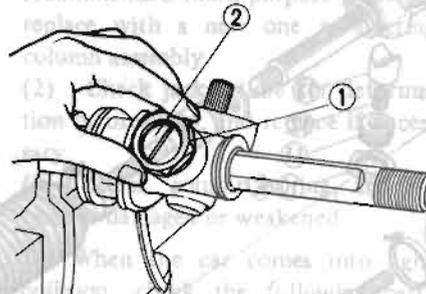


Fig. ST-14 Removing Side Rod

5. Loosen adjust lock nut and remove retainer adjust screw.

Then take retainer spring and steering gear retainer out.



- 1 Adjusting lock nut
- 2 Retainer adjusting screw

ST842

Fig. ST-15 Removing Adjusting Lock Nut

6. Remove oil seal from gear housing.

Note: Oil seal must not be reused.

7. Pry off snap ring from gear housing.
8. Draw steering pinion assembly out.
9. Draw rack out from gear housing.

Pinion gear

1. Pry off snap ring securing pinion bearing from the side of bearing.
2. Press out bearing from pinion shaft.

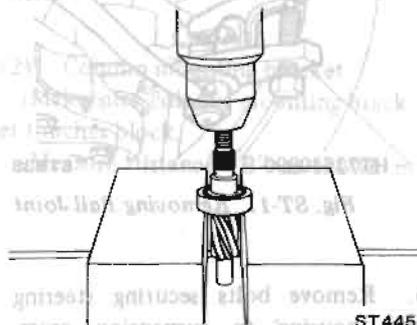


Fig. ST-16 Removing Pinion Shaft

INSPECTION

Thoroughly clean all parts in cleaning solvent, and blow dry with compressed air, if available.

Rack

Thoroughly examine rack gear. If rack gear is worn, replace.

Fractures, hollows, or roughness in surfaces of rack indicate unserviceability.

Pinion

Thoroughly examine pinion gear. If pinion gear is damaged, cracked or worn, replace.

Side rod outer ball joint

Measure the swinging torque and axial play. When values are not within the specified range, replace.

Side rod outer ball joint

Swinging torque:

3 to 50 kg-cm

(3 to 43 in-lb)

Axial play:

0.1 to 0.5 mm

(0.004 to 0.020 in)

Side rod inner ball joint

Check inner ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Side rod inner ball joint

Swinging torque:

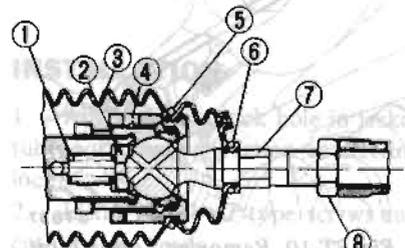
0 to 50 kg-cm

(0 to 43 in-lb)

Axial play:

0 to 0.05 mm

(0 to 0.0020 in)



- 1 Side rod spring
- 2 Spring seat
- 3 Boot
- 4 Welded
- 5 Dust cover clamp
- 6 Boot clamp
- 7 Side rod ball
- 8 Stopper nut

ST447

Fig. ST-17 Side Rod Inner Ball Joint

Steering System

Pinion bearing

Inspect bearings to see that they roll freely and are free from cracked, pitted, or worn balls, rollers and races. Replace if necessary.

Oil seal

Replace oil seal every disassembly even if it appears serviceable.

Retainer spring

Refer to Service Data and Specifications.

Side rod spring

Refer to Service Data and Specifications.

ASSEMBLY AND ADJUSTMENT

Assemble steering gear in reverse order of disassembly. Observe following instructions.

Rack and pinion

1. Install inner snap ring ② onto pinion gear. See Fig. ST-19.

Inner snap ring thickness:
1.19 to 1.24 mm
(0.0469 to 0.0488 in)

2. Press bearing onto pinion gear.

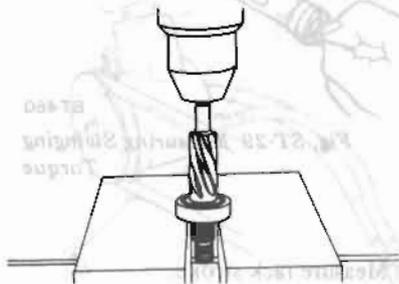


Fig. ST-18 Pressing Bearing onto Pinion Gear

3. Install outer snap ring ①.

Snap ring ① should be of such thickness that axial play is less than 0.1 mm (0.004 in).

To ensure proper axial play, select snap ring of proper thickness.

Pinion bearing inner snap ring:

Refer to Service Data and Specifications.

Note: Snap rings should be fitted to grooves correctly.

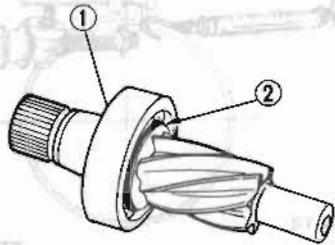


Fig. ST-19 Pinion with Snap Ring

4. Clamp steering gear housing in a vise.

5. Sparingly apply recommended multi-purpose grease to toothed faces and friction surfaces of rack.

6. Insert rack gear from gear housing side.

Note: Pay attention to direction of rack teeth.

7. Properly mesh pinion with rack, and insert pinion assembly into groove in pinion serration part facing upward. See Fig. ST-20.

8. Make sure that rack protrudes by the same amount from both ends of housing.

Standard length "L" (both sides)

L: 89.4 mm (3.520 in)

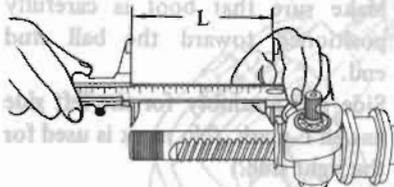


Fig. ST-20 Measuring Protruding Portion of Rack

9. Secure pinion bearing to gear housing with snap ring.

Snap ring should be of such thickness that axial play is less than 0.1 mm (0.004 in).

Pinion bearing outer snap ring:
Refer to Service Data and Specifications.

10. Fit grease seal.

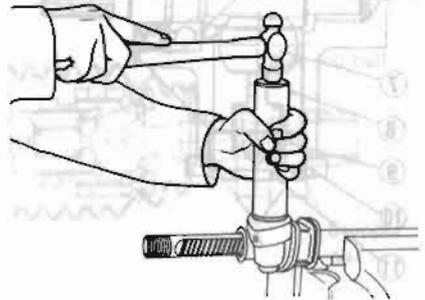


Fig. ST-21 Fitting Oil Seal

Note: Pack sealing lips with multi-purpose grease.

11. Make sure that pinion assembly rotates smoothly.

12. Apply an adequate amount of recommended multi-purpose grease to steering gear retainer.

13. Insert gear retainer and retainer spring into housing. Turn retainer adjusting screw in, and install adjusting lock nut.

14. Fully tighten adjusting screw and then back it off 20 to 25 degrees.

15. Apply suitable liquid sealant around lock nut at "A" and tighten lock nut. See Fig. ST-23.

ⓧ Tightening torque:

4 to 6 kg-m (29 to 43 ft-lb)

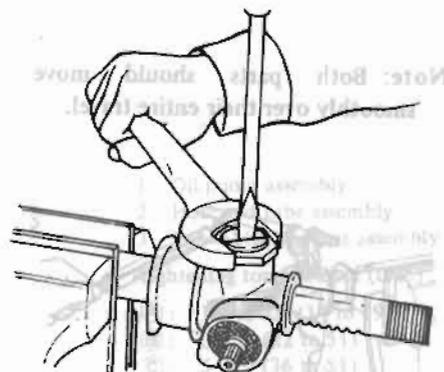
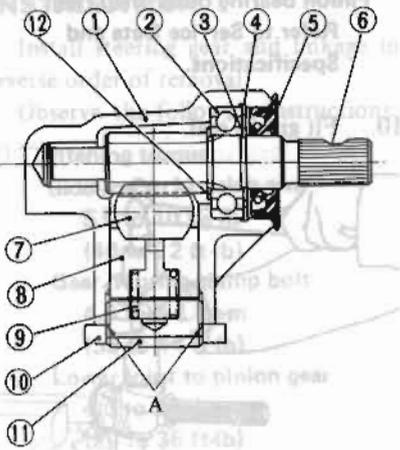


Fig. ST-22 Locking Retainer Lock Nut

Steering System



- 1 Steering gear housing
- 2 Steering pinion bearing
- 3 Snap ring
- 4 Pinion bearing outer snap ring
- 5 Oil seal
- 6 Steering gear pinion
- 7 Steering rack gear
- 8 Steering gear retainer
- 9 Retainer spring
- 10 Lock nut
- 11 Retainer adjust screw
- 12 Snapping

ST847

Fig. ST-23 Area to Which Liquid Sealant is Applied

16. Upon completion of gear assembly measure the torque required to keep pinion and rack in motion. Re-adjust retainer adjusting screw as necessary to obtain proper torque.

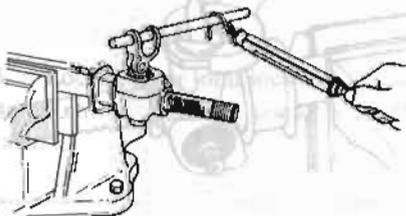
Pinion (turning torque):

Less than 20 kg-cm (17 in-lb)

Rack (force to pull at neutral position):

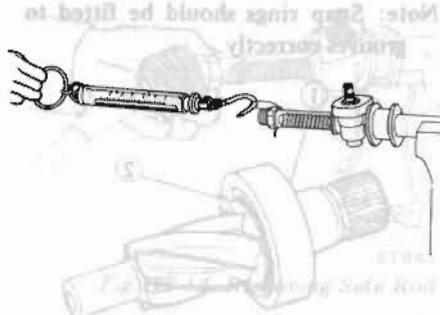
Less than 10 kg (22 lb)

Note: Both parts should move smoothly over their entire travel.



ST848

Fig. ST-24 Measuring Pinion Rotary Torque

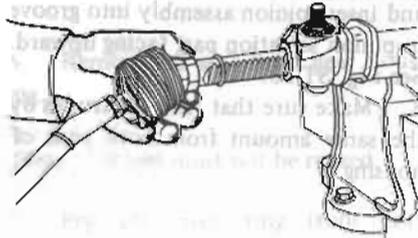


ST849

Fig. ST-25 Measuring Rack Force to Pull

Side rod and gear boot

1. Fit boot and small clamp on side rod assembly.
2. Thread lock nut and lock nut over the threaded portion of rack.
3. Apply an adequate amount of recommended multi-purpose grease to the sliding surfaces of side rod inner joint and spring seat.
4. Fit side rod assembly to rack end together with inner spring and spring seat.

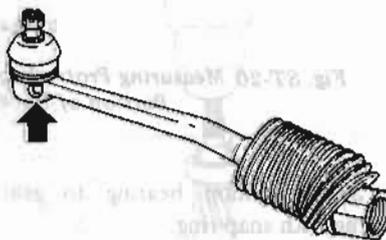


ST841

Fig. ST-26 Fitting Side Rod Assembly to Rack

Note:

- a. Make sure that boot is carefully positioned toward the ball stud end.
- b. Side rod assembly for the left side has an L-mark. (No mark is used for the right side.)

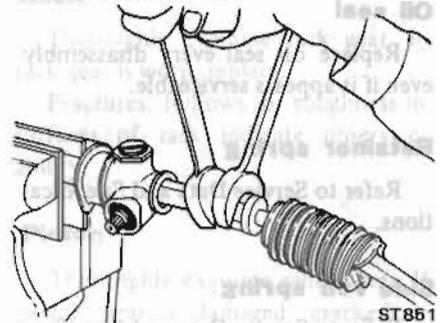


ST458

Fig. ST-27 L-mark

5. Screw inner socket portion until ball seat reaches the rack end, and then tighten lock nut securely.

Ⓣ **Tightening torque:**
8 to 10 kg-m
(58 to 72 ft-lb)



ST851

Fig. ST-28 Tightening Lock Nut

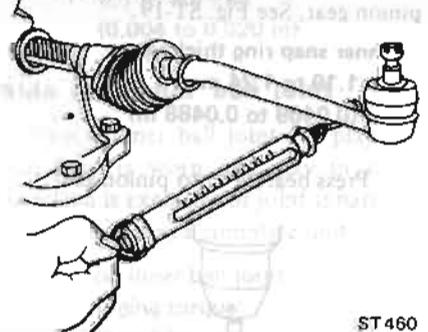
6. Upon completion of side rod assembly, measure swinging torque and axial play of inner ball joint.

Swinging torque:

0 to 50 kg-cm
(0 to 43 in-lb)

Axial play:

0 to 0.05 mm
(0 to 0.0020 in)

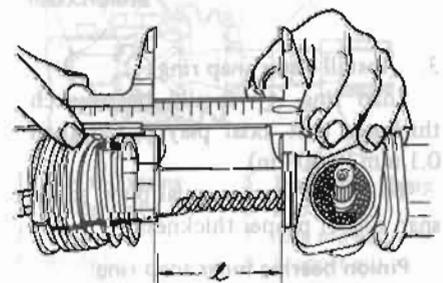


ST460

Fig. ST-29 Measuring Swinging Torque

7. Measure rack stroke.

Rack stroke "L" (both sides):
66.4 mm (2.614 in)



ST853

Fig. ST-30 Measuring Rack Stroke

Steering System

8. Fit large boot clamp at inner socket, install a grease nipple at both ends of rack, and apply recommended multi-purpose grease to each joint.

Note: Lubrication of the rack ends is made so that a small quantity of new grease appears at the boot grease outlet hole.

Do not apply an excessive amount of grease.

9. Install boot to gear housing, then tighten inside boot clamp securely.

POWER STEERING GEAR (I.P.S. 56L) AND OIL PUMP

DESCRIPTION

Power steering system

CAUTION:

a. The part which is to be installed should be checked for damage and never reuse any of the parts that have been damaged. If any of the parts are damaged, they should be replaced with new parts of the same type and specification.

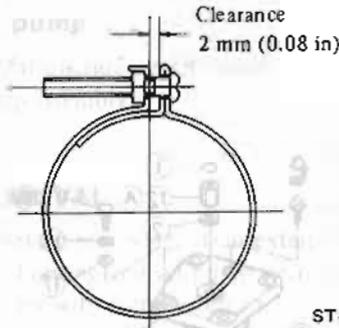
b. Disassemble the steering gear and oil pump assembly and clean it thoroughly before reassembly. Use a brush and clean oil for cleaning. Do not use any solvent or other cleaning agents.

c. Should necessary, it is recommended to use a special grease for the steering gear and oil pump assembly. Refer to the instruction manual for the details.

d. Heads should be cleaned immediately before disassembly.

e. Do not use a rag or any other material to clean the steering gear and oil pump assembly. Use a clean cloth.

f. Be sure to follow the instructions and cautions indicated in the service manual.



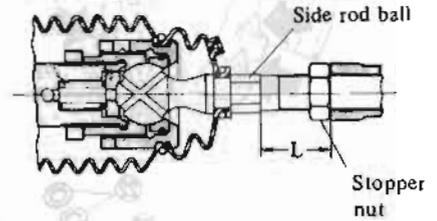
ST462

Fig. ST-31 Tightening Boot Clamp

Note: Boot should be neither too inflated nor too elongated.

10. Adjust the side rod length both left and right, and tighten steering stopper nuts.

Tightening torque:
8 to 10 kg-m
(58 to 72 ft-lb)
Side rod length "L"
29.5 mm (1.161 in)

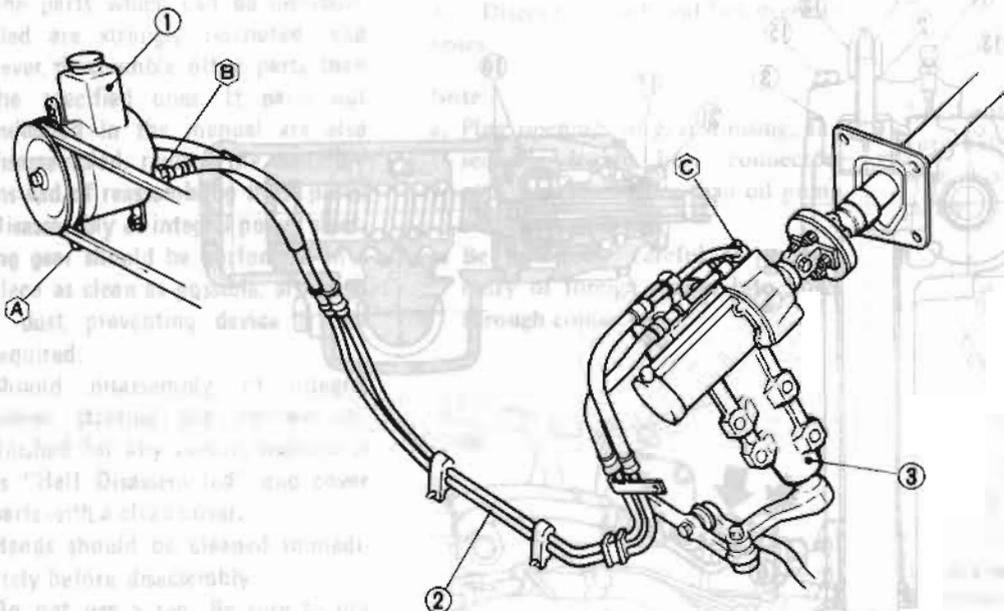


ST871

Fig. ST-32 Adjusting Side Rod Length

The integral power steering unit is a gear housing into which a control valve and power cylinder are built compactly. The major components are an oil pump, power steering gear and oil

pipings to connect these parts. Only the sealing parts of the gear assembly can be replaced individually. The remaining parts must be replaced as an assembly.



- 1 Oil pump assembly
- 2 Hose and tube assembly
- 3 Power steering gear assembly

Tightening torque kg-m (ft-lb)

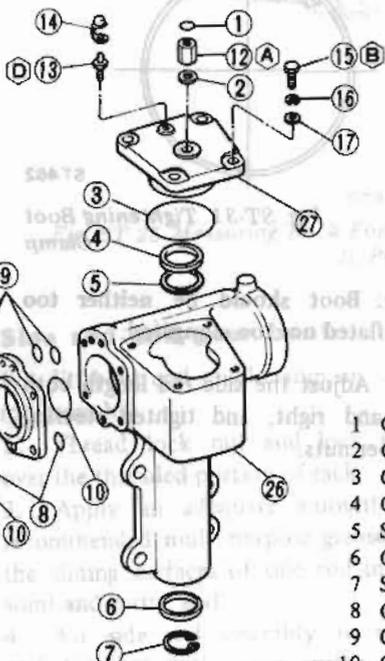
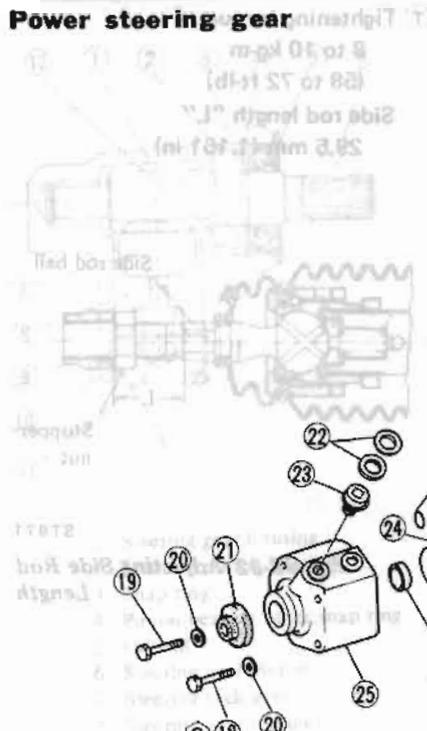
- Ⓐ: 1.9 to 2.6 (14 to 19)
- Ⓑ: 3 to 7 (22 to 51)
- Ⓒ: 5 to 7 (36 to 51)

ST854

Fig. ST-33 Power Steering System

Steering System

Power steering gear



- | | |
|---------------------------------|------------------------|
| 1 O-ring | 15 Bolt sector cover |
| 2 Copper washer | 16 Spring washer |
| 3 O-ring | 17 Plain washer |
| 4 Oil seal (high pressure side) | 18 Bolt rear housing-A |
| 5 Stopper | 19 Bolt rear housing-B |
| 6 Oil seal (low pressure side) | 20 Spring washer |
| 7 Snap ring | 21 Cap rear housing |
| 8 O-ring | 22 Copper washer |
| 9 O-ring | 23 Blind plug |
| 10 O-ring | 24 Intermediate cover |
| 11 Oil seal | 25 Rear housing |
| 12 Lock nut | 26 Gear housing |
| 13 Breather screw | 27 Sector cover |
| 14 Breather cap | |

Tightening torque kg-m (ft-lb)

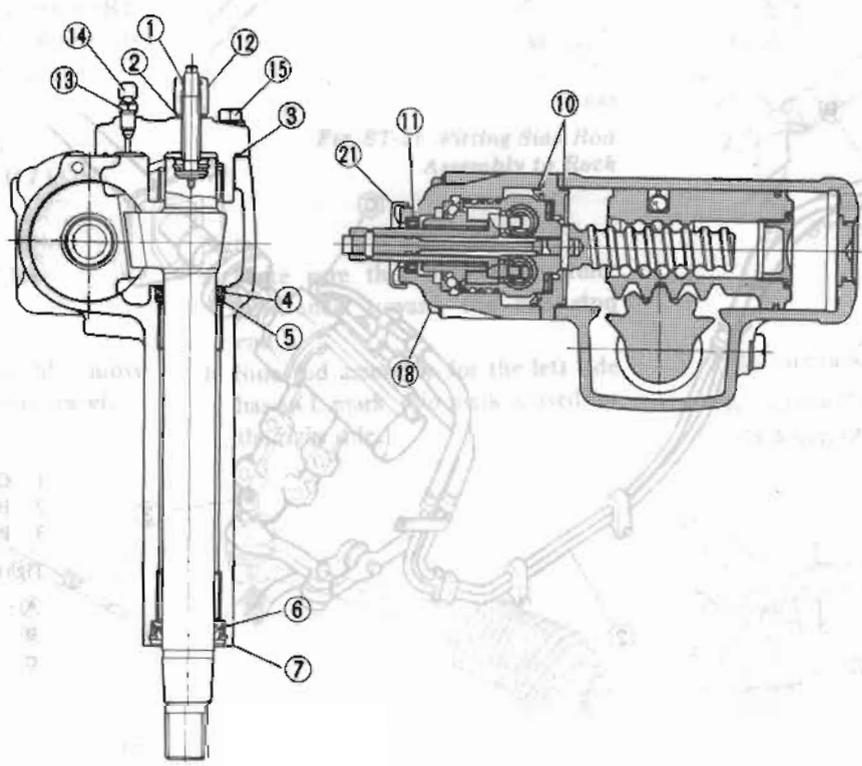
(A) : 2.9 to 3.5 (21 to 25)

(B) : 2.7 to 3.3 (20 to 24)

(C) : 2.7 to 3.3 (20 to 24)

(D) : 0.7 to 0.9 (5.1 to 6.5)

Note: No. 1 to 11, once removed, must not be used again.



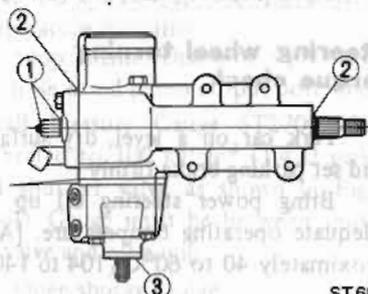
ST682
Fig. ST-34 Integral Power Steering

Steering System

For the integral power steering gear, replacement parts shown in Fig. ST-34 are available to repair oil leaks.

According to the position of the oil leak shown in Fig. ST-35, disassembly is divided into the three categories below:

- 1) For a leak in position ①, refer to "Adjusting screw lock nut seal replacement".
- 2) For a leak in position ②, refer to "Sector shaft seal replacement".
- 3) For a leak in position ③, refer to "Rear housing seal replacement".



ST683

Fig. ST-35 Sealing Positions

The integral power steering gear is an accurate oil pressure mechanism. In disassembling it, be careful to keep dust, iron powder and other foreign particles out of the gear housing.

CAUTION:

- a. The parts which can be disassembled are strongly restricted, and never disassemble other parts than the specified ones. If parts not indicated in the manual are also disassembled, replace the assembly instead of reassembling those parts.
- b. Disassembly of integral power steering gear should be performed in a place as clean as possible, although a dust preventing device is not required.
- c. Should disassembly of integral power steering gear remain unfinished for any reason, indicate it as "Half Disassembled" and cover parts with a clean cover.
- d. Hands should be cleaned immediately before disassembly.
- e. Do not use a rag. Be sure to use nylon or paper cloth.
- f. Be sure to follow procedures and cautions indicated in the service manual.

Oil pump

Malfunctioning (Replace as an oil pump assembly).

REMOVAL

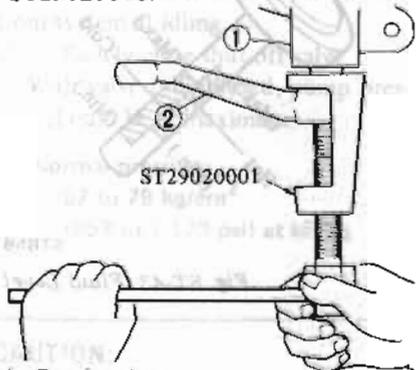
Before removing, clean exteriors of gear housing and oil pump with steam and dry with compressed air.

Steering gear

1. Remove bolt securing stub shaft to rubber coupling.

Refer to Steering Column.

2. Remove steering gear arm using Steering Gear Arm Puller ST29020001.



ST289

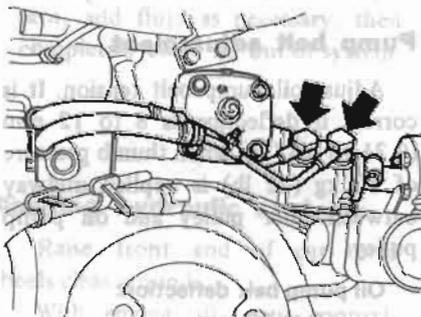
- 1 Gear housing
- 2 Gear arm

Fig. ST-36 Removing Gear Arm

3. Disconnect high and low pressure hoses.

Note:

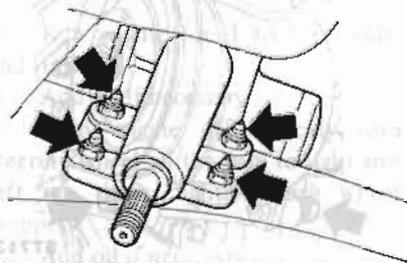
- a. Plug openings of gear housing, and securely locate hose connectors at a position higher than oil pump and cover with rag.
- b. Be extremely careful to prevent entry of foreign matter into hoses through connectors.



ST856

Fig. ST-37 Disconnecting Hose

4. Remove bolts securing steering gear housing to body side frame, and withdraw steering gear housing from engine compartment.



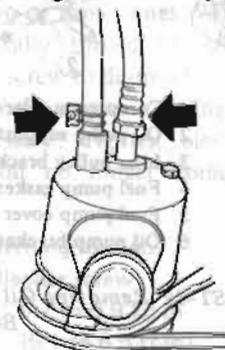
ST856

Fig. ST-38 Removing Steering Gear

Oil pump and hose

1. Disconnect hoses at pump.

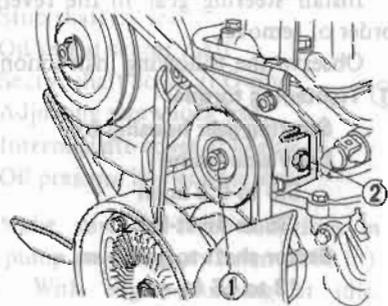
Install caps at hose fittings to prevent drainage of oil from pump.



ST857

Fig. ST-39 Disconnecting Hose at Pump

2. Loosen oil pump pulley lock nut. Turn belt adjusting bolt counterclockwise. Loosen and remove belt from pulley.



- 1 Lock nut
- 2 Adjusting bolt

ST712

Fig. ST-40 Loosening Pump Belt

3. Remove oil pump retaining bolts.

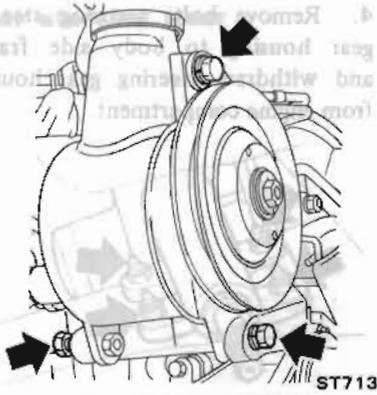
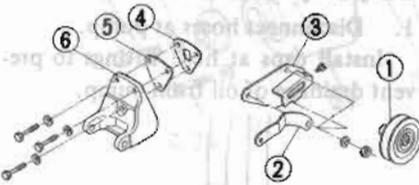


Fig. ST-41 Removing Oil Pump

4. Remove oil pump from engine.
5. Remove oil pump brackets and other brackets from engine



- 1 Compressor idler pulley
- 2 Oil pump support
- 3 Idler pulley bracket
- 4 Fuel pump gasket
- 5 Fuel pump cover
- 6 Oil pump bracket

Fig. ST-42 Removing Oil Pump Bracket

6. Unfasten hose clamps, and remove hoses from engine compartment.

INSTALLATION AND ADJUSTMENT

Install steering gear in the reverse order of removal.

Observe the following instructions:

Tightening torque:

Steering gear housing to body side frame

5.3 to 6.3 kg-m
(38 to 46 ft-lb)

Sector shaft to gear arm

13 to 15 kg-m
(94 to 108 ft-lb)

Stub shaft to coupling

3.3 to 3.9 kg-m
(24 to 28 ft-lb)

Hose to gear housing

5.0 to 7.0 kg-m
(36 to 51 ft-lb)

Hose to pump
3 to 7 kg-m
(22 to 51 ft-lb)

Pump to bracket
1.9 to 2.6 kg-m
(14 to 19 ft-lb)

Fluid level

1. Check oil level in reservoir by checking dip stick on "HOT" side at normal operating temperature or "COLD" side when oil is cold.

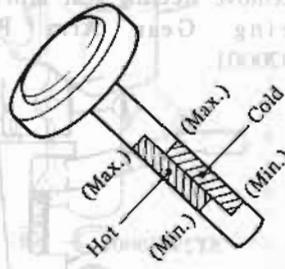


Fig. ST-43 Fluid Level

Note:

- a. Do not overfill with oil.
- b. Normal operating temperature is 60 to 80°C (140 to 176°F).

2. Check fluid level and leakage at the recommended interval.

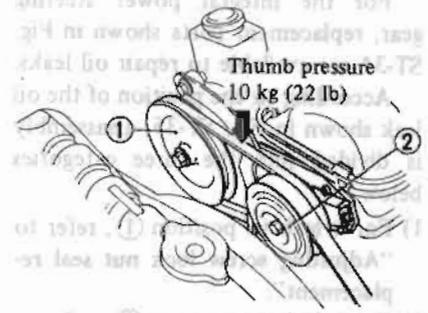
Recommended oil is Automatic Transmission Fluid "Dexron Type". See Section GI "Recommended Lubricant".

Pump belt adjustment

Adjust oil pump belt tension. It is correct if deflection is 8 to 12 mm (0.31 to 0.47 in) when thumb pressure of 10 kg (22 lb) is applied midway between idler pulley and oil pump pulley.

Oil pump belt deflection:

8 to 12 mm
(0.31 to 0.47 in)
at 10 kg (22 lb)



- 1 Oil pump pulley
- 2 Idler pulley

Fig. ST-44 Oil Pump Belt Tension

Steering wheel turning torque check

1. Park car on a level, dry surface and set parking brake firmly.
2. Bring power steering oil up to adequate operating temperature. [Approximately 40 to 60°C (104 to 140°F)].

Note:

- a. It is easy to bring power steering oil up to adequate operating temperature by idling engine and at the same time turning steering wheel from left to right for about two minutes. Alternatively, drive car several miles.
- b. Tires must be inflated to normal pressure.
3. Check steering wheel turning torque when steering wheel has been turned 360° from straight-ahead position.

Steering wheel turning torque:

2.5 to 3.0 kg
(5.5 to 6.6 lb) at
circumference of steering
wheel

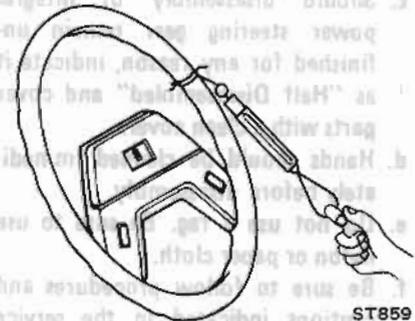


Fig. ST-45 Measuring Turning Torque

Steering System

Hydraulic system check

To determine whether problem is in steering gear or oil pump, measure operating pressure.

Before conducting hydraulic system test, carefully check belt tension and condition of driving pulley.

Note: Tires must be inflated to normal pressure.

1. Run engine and make sure temperature of oil in pump rises to 40 to 60°C (104 to 140°F) with a temperature indicator.
2. Stop engine. Disconnect pressure line hose at oil pump output port, and install Pressure Gauge ST27091000 calibrated to 100 kg/cm² (1,422 psi), and shut-off valve as shown in Fig. ST-40. Gauge must be between shut-off valve and oil pump.
3. Open shut-off valve.

Ⓣ **Tightening torque:**

3 to 5 kg-m
(22 to 36 ft-lb)

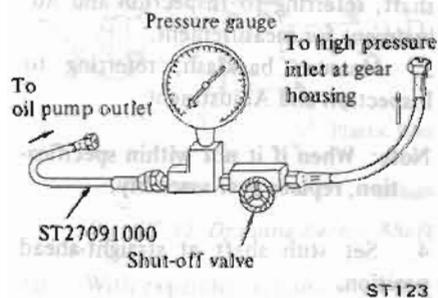


Fig. ST-46 Pressure Gauge

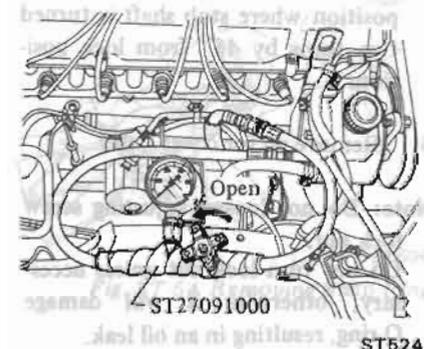


Fig. ST-47 Installing Pressure Gauge

4. Check oil level, adding oil if necessary.

5. Start engine and run it at idle.
6. Run engine for 3 to 5 seconds, and then stop it.
7. Check oil level in oil pump reservoir tank and, if necessary, replenish.
8. Run engine and check oil level again.
9. Continue running engine at idle until oil reaches operating temperature; turn steering wheel fully in both directions for approximately two minutes.

Note: Be sure that all connections are tight.

10. Move steering wheel from right to left several times to expel any air from system at idling.

11. Slowly close shut-off valve.

With valve fully closed, pump pressure should be at maximum.

Normal pressure:

67 to 79 kg/cm²
(953 to 1,123 psi) at idling

CAUTION:

Do not close shut-off valve for more than fifteen seconds, as this would abnormally increase lubricant temperature and cause undue pump wear.

12. If pressure increases beyond upper limit, pressure relief valve of oil pump is not functioning properly. Replace as an assembly.

13. If, with shut-off valve fully closed, pressure drops below lower limit, the problem is in pump. Replace as an assembly.

Note: After checking hydraulic system, add fluid as necessary, then completely bleed air out of system.

Bleeding hydraulic system

1. Raise front end of car until wheels clear ground.
2. With engine off, pour approximately 500 to 600 cc (30.51 to 36.61 cu in) of oil into oil reservoir.

Note: Recommended oil is Automatic Transmission Fluid "Dexron Type". See Section GI Recommended Lubricant.

3. Run engine for 3 to 5 seconds, and turn off.
4. Add oil if necessary.
5. With engine off, quickly turn steering wheel all the way to right and left ten times, lightly touch wheel stoppers.
6. Add oil if necessary.
7. Start engine and operate it at idling speed.

Repeat above procedure until pump will bleed at reservoir tank.

8. With steering wheel fully turned to left, open bleeder screw to expel air.

9. Tighten bleeder screw. Turn steering wheel left and right from lock to lock two or three times. With steering wheel fully turned to right, loosen bleeder screw to drain oil.

10. With engine running, add oil if necessary. Tighten bleeder screw when oil no longer comes out of bleeder.

Ⓣ **Tightening torque:**

Bleeder screw

0.7 to 0.9 kg-m
(5.1 to 6.5 ft-lb)

11. Stop engine and, lower car until it just touches ground. Restart engine and run it at idle speed; turn steering wheel to right and left several times. Then, hold steering wheel at each "lock" position for at least five seconds and carefully check the following points for oil leakage.

- Stub shaft oil seal
- Oil seal at sector shaft
- Sector shaft cover at O-ring
- Adjusting screw lock nut.
- Intermediate cover at O-ring.
- Oil pressure line connectors

Make sure oil level variations in oil pump are less than 2 mm (0.08 in).

12. With engine running at idle, measure steering wheel turning torque. Refer to Steering Wheel Turning Torque Check.

This completes the air bleeding operation. If air bleeding is not completely accomplished, the following symptoms may occur:

- Appearance of air bubbles in oil at oil pump filler opening
- Considerable variations in oil level at oil pump filler opening
- Noise in oil pump

13. If further air bleeding is needed, proceed as follows:

- With engine running at 1,000 to 1,500 rpm, repeat steps 6 through 9 above.
- Turn steering wheel to right and left from lock to lock five to ten times. Carefully check for oil leakage with steering wheel held at each lock position for five seconds.

CAUTION:

Do not hold steering wheel at lock position for more than fifteen seconds at a time.

INSPECTION AND ADJUSTMENT

Wash clean all disassembled parts in suitable cleaning solvent and check their condition.

Check sealing portion.

- Adjusting screw nut seal
- Sector shaft seal
- Rear housing seal

Discard any oil seal which has once been removed. Replace oil seal if sealing surface is deformed or cracked.

Turning torque measurement

- Install gear assembly on Steering Gear Housing Attachment KV48100300 and anchor it with a vise.
- Using Preload Gauge ST3127S000, measure turning torque of stub shaft at 360° from neutral to right in alternating directions.

Note: Stub shaft can be turned by wrapping vinyl tape around serration area of stub shaft and fitting hexagonal wrench socket.

Turning torque at 360°:

- Less than 12 kg-cm (10 in-lb)

Note: If it is beyond specification, gear must be replaced as an assembly.

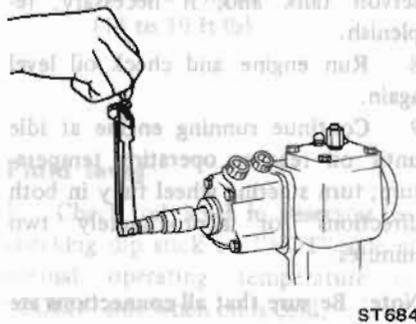


Fig. ST-48 Measuring Turning Torque

Backlash adjustment

- Measure turning torque, referring to Turning torque measurement.
- Loosen lock nut and turn adjusting screw until stub shaft turning torque at neutral position is within specified values.

Turning torque at neutral position:

1 to 4 kg-cm (0.9 to 3.5 in-lb) higher than at 360°

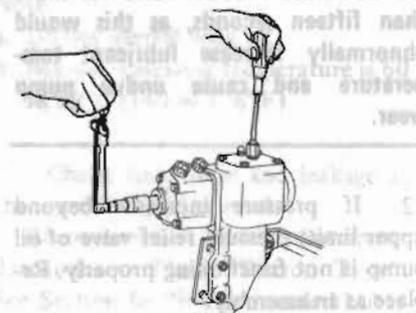


Fig. ST-49 Adjusting Backlash

- After adjustment is completed, tighten lock nut.

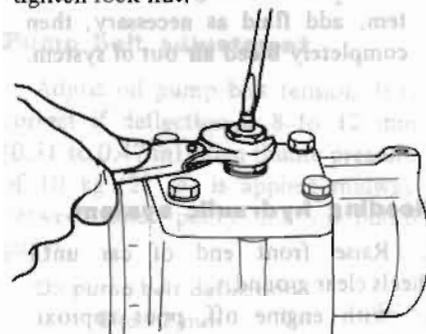


Fig. ST-50 Tightening Lock Nut

Note: Measure turning torque and adjust backlash. If they are within specifications, replace gear assembly.

DISASSEMBLY

Adjusting screw lock nut seal

- Measure turning torque of stub shaft, referring to Inspection and Adjustment.
- Remove lock nut, and replace O-ring.

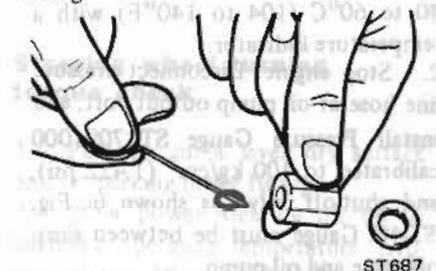


Fig. ST-51 O-ring Replacement

Sector shaft seal

- Install gear assembly on attachment and anchor it with a vise.
- Measure turning torque of stub shaft, referring to Inspection and Adjustment for measurement.
- Measure backlash, referring to Inspection and Adjustment.

Note: When if it not within specification, replace gear assembly.

- Set stub shaft at straight-ahead position.

Note: Straight-ahead position is a position where stub shaft is turned two turns by 45° from lock position.

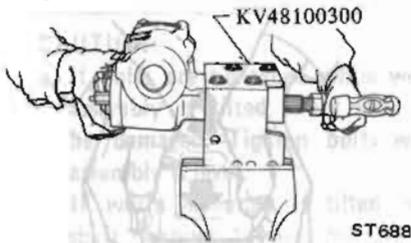
- Remove sector cover bolt.

Note: Do not loosen adjusting screw lock nut.

Do not turn lock nut unless necessary; otherwise it will damage O-ring, resulting in an oil leak.

- Install gear arm lock nut.
- Hold sector cover by hand, and with a plastic mallet, knock out end of sector shaft approximately 20 mm (0.79 in).

Steering System



ST688

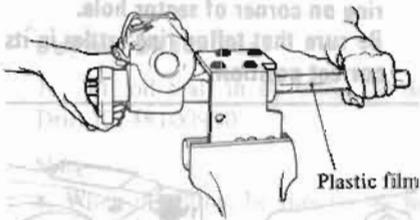
Fig. ST-52 Knocking out Sector Shaft

8. Connect a roll of plastic film to sector shaft.

Note: Plastic film is 0.1 mm (0.004 in) in thickness, 200 mm (7.87 in) in length and 200 mm (7.87 in) in width.

9. Pull out sector shaft by hand. At this time, leave roll in position where it fits into two bearings in sector housing.

Note: Roll is for preventing needle bearings from dropping down. Make sure that roll is kept in housing while following work is going on.

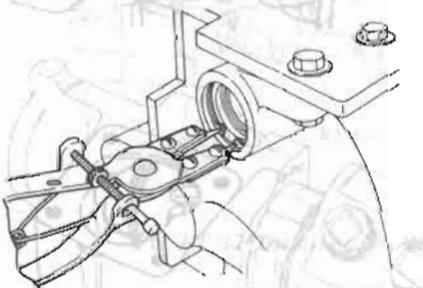


Plastic film

ST689

Fig. ST-53 Drawing Sector Shaft

10. With expander, remove snap ring from gear housing.

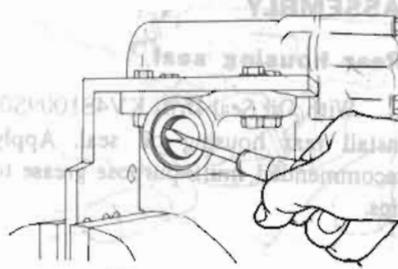


ST690

Fig. ST-54 Removing Snap Ring

11. With a screwdriver, remove oil seal (on low pressure side).

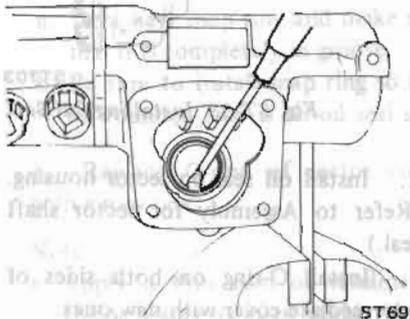
Note: Apply blade of screwdriver to oil seal lightly so that it will not damage inner side of gear housing.



ST691

Fig. ST-55 Removing Oil Seal

12. With an offset screwdriver, remove oil seal (on high pressure side) along with stopper.



ST692

Fig. ST-56 Removing Oil Seal

Note: Snap ring, oil seal and stopper, once removed, must not be used again.

Rear housing seal

1. Install gear assembly on attachment, and anchor it with a vise.

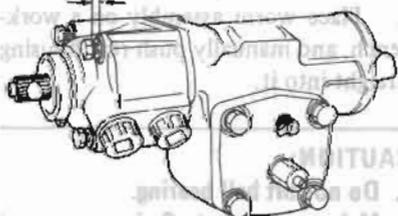
2. Measure turning torque of stub shaft, referring to Inspection and Adjustment for measurement.

Note: When if it not within specification, replace gear assembly.

3. Loosen four rear cover bolts about 5 mm (0.20 in).

Note: Do not remove rear cover.

About 5 mm (0.20 in)



ST697

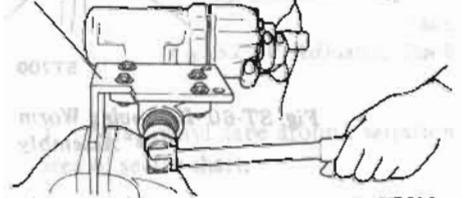
Fig. ST-57 Loosening Rear Cover Bolts

4. By turning stub shaft clockwise bring piston completely to rear side.

5. Install gear arm lock nut on sector shaft.

Turn sector shaft clockwise slightly to raise intermediate cover through piston.

KV48100300



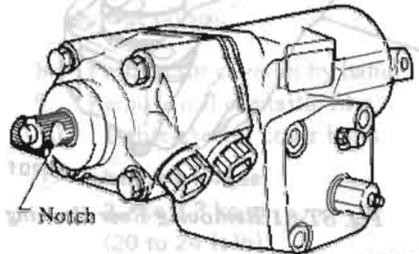
ST698

Fig. ST-58 Disconnecting Intermediate Cover

6. Remove gear arm lock nut.

7. Turn stub shaft counterclockwise and place piston in its neutral position.

Note: Neutral position is a position where piston is turned two turns by 45° from lock position, and notch of stub shaft is located on adjusting screw side.



ST699

Fig. ST-59 Neutral Position

8. Remove sector shaft. (Refer to Sector Shaft Seal for disassembly.)

9. Move piston again completely to rear side and then remove rear cover bolt.

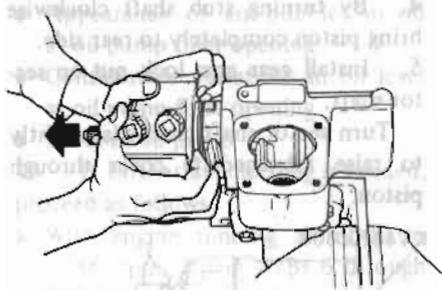
10. Pull out worm assembly.

CAUTION:

a. When worm assembly is removed, piston may turn and come off under its own weight. Hold piston to prevent it from turning.

If piston-to-intermediate cover clearance exceeds 45 mm (1.77 in) by loosening, recirculating ball will be out of groove of worm; do not reinstall piston but replace the entire assembly.

b. Take care not to damage teflon ring at piston end when removing.



ST700

Fig. ST-60 Removing Worm Assembly

11. Turn worm assembly upside down, and lightly tap stub shaft end on top of workbench, removing rear housing.

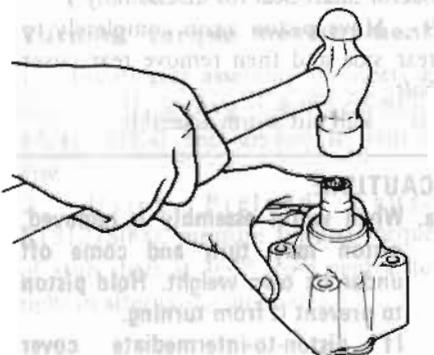
Note: Do not strike shaft with a hammer or pry it with a screwdriver.



ST701

Fig. ST-61 Removing Rear Housing

12. With an appropriate wrench socket, remove rear housing oil seal.



ST702

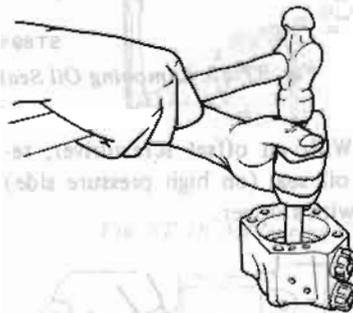
Fig. ST-62 Removing Rear Housing Oil Seal

13. Remove O-ring on both sides of intermediate cover.

ASSEMBLY

Rear housing seal

1. With Oil Seal Drift KV481009S0, install rear housing oil seal. Apply recommended multi-purpose grease to lips.



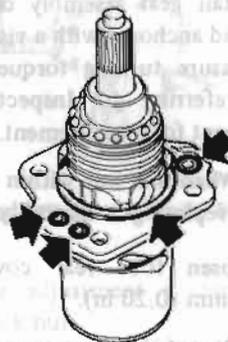
ST703

Fig. ST-63 Installing Oil Seal

2. Install oil seal on sector housing. (Refer to Assembly for sector shaft seal.)
3. Install O-ring on both sides of intermediate cover with new ones.

Note:

- Apply a thin coat of vaseline to new O-rings prior to their installation.
- Be careful not to install wrong O-rings as some of them resemble in size.



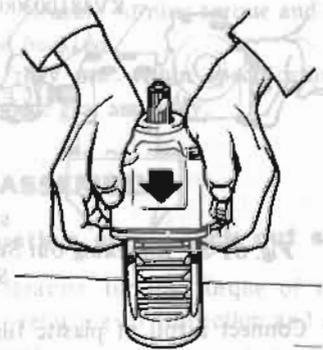
ST704

Fig. ST-64 Installing O-rings

4. Place worm assembly on a workbench, and manually push rear housing straight into it.

CAUTION:

- Do not tilt ball bearing.
- Make sure that O-rings are not protruding or extruding.



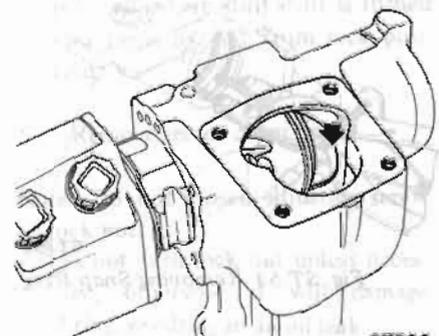
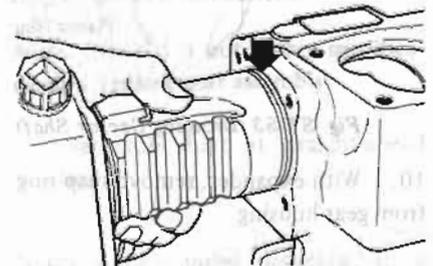
ST705

Fig. ST-65 Installing Rear Housing

5. Insert worm assembly into gear housing.

CAUTION:

- Take care that teflon ring at piston end is not damaged during insertion of gear housing.
- When worm assembly is halfway inserted, teflon ring is deflected. Insert remaining part of worm assembly paying particular attention. Take care not to damage teflon ring on corner of sector hole. Be sure that teflon ring settles in its correct position.



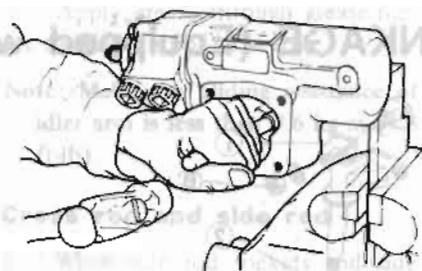
ST706

Fig. ST-66 Installing Worm Assembly

6. Gradually tighten rear housing bolts in a criss-cross fashion.

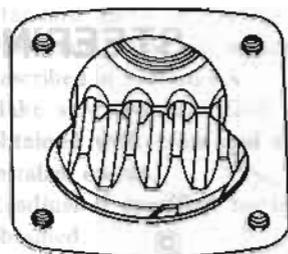
CAUTION:

- a. If bolts are tightened while worm assembly is tilted, inner seals will be damaged. Tighten bolts while assembly is level.
- If worm assembly is tilted, stub shaft turning torque will be increased.
- b. Check O-rings to ensure that they do not protrude or extrude.



ST694

Fig. ST-68 Installing Oil Seal



ST696

Fig. ST-70 Adjusting Rack

Ⓣ Tightening torque:
2.7 to 3.3 kg-m
(20 to 24 ft-lb)

Adjusting screw lock nut seal

1. Install lock nut by using new O-ring and new copper washer.

Note: Apply vaseline to new O-ring.

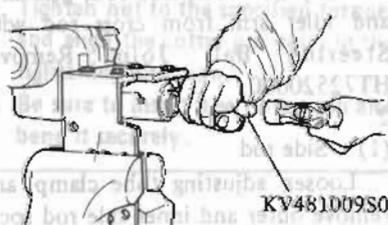
2. Adjust backlash. (Refer to Inspection and Adjustment.)

Sector shaft seal

1. Fit oil seals in by using Oil Seal Drift KV481009S0.

Note:

- a. When installing, be sure to use new oil seals and stopper.
- b. Apply recommended multi-purpose grease to oil seal lips.



ST693

Fig. ST-67 Installing Oil Seal

2. With an expander, install a new snap ring.

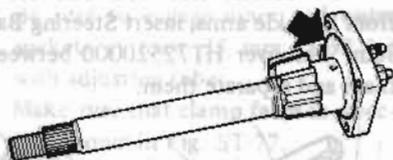
Note:

- a. Turn new snap ring and make sure that it is completely in groove.
- b. Be sure to install snap ring so that its rounded side is on oil seal side.

3. Replace O-ring of sector cover with a new one.

Note:

- a. Apply a thin coat of vaseline to O-ring before its installation.
- b. Make certain that O-ring is installed properly, and not damaged by sector shaft.



ST696

Fig. ST-69 Replacing O-ring

4. Set piston rack at center and tilt it toward yourself with your finger about 10° to 15°.

Note: This is for smooth insertion of sector gear.

5. Wrap vinyl tape around serration area of sector shaft.

Note: The reason is that vinyl tape prevents oil seal lip from being damaged during insertion.

6. Connect sector shaft to roll of plastic film.
7. In order for rack and sector gear to be correctly in mesh at center, guide sector gear and insert it into gear housing.

Note: Insert sector shaft into gear housing gently; be careful not to damage oil seal.

8. Push sector cover in by hand.
9. Remove roll of plastic film.
10. Tighten sector cover bolts.

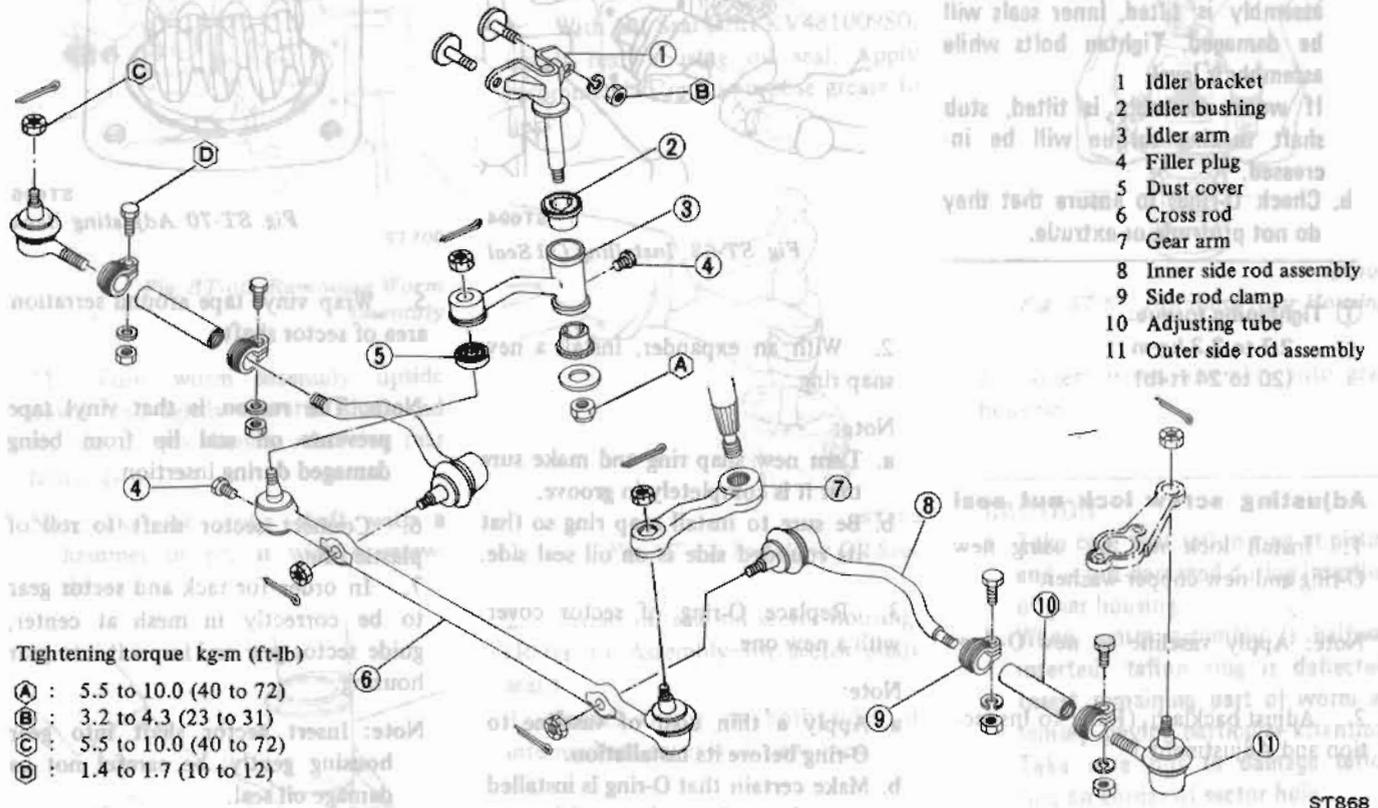
Ⓣ Tightening torque:
2.7 to 3.3 kg-m
(20 to 24 ft-lb)

11. Check turning torque and backlash of stub shaft, referring to Inspection and Adjustment of Measurement.

Note: If there is a great difference between values of turning torque before and after disassembly, it must be assumed that some new problem has occurred. It will be necessary to replace the entire assembly.



STEERING LINKAGE (Equipped with I.P.S. 56L)



- 1 Idler bracket
- 2 Idler bushing
- 3 Idler arm
- 4 Filler plug
- 5 Dust cover
- 6 Cross rod
- 7 Gear arm
- 8 Inner side rod assembly
- 9 Side rod clamp
- 10 Adjusting tube
- 11 Outer side rod assembly

Tightening torque kg-m (ft-lb)

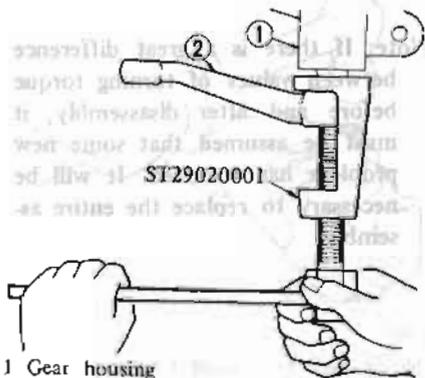
- Ⓐ : 5.5 to 10.0 (40 to 72)
- Ⓑ : 3.2 to 4.3 (23 to 31)
- Ⓒ : 5.5 to 10.0 (40 to 72)
- Ⓓ : 1.4 to 1.7 (10 to 12)

ST868

Fig. ST-71 Steering Linkage

REMOVAL AND INSTALLATION

1. Jack up the front of car and support it on the safety stands.
2. Block rear wheels with chocks.
3. Remove gear arm using Steering Gear Arm Puller ST29020001.



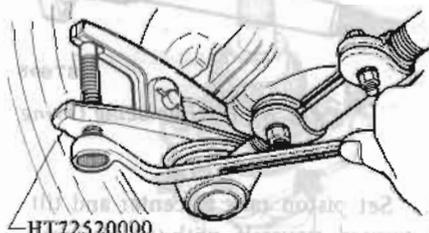
- 1 Gear housing
- 2 Gear arm

ST289

Fig. ST-72 Removing Gear Arm

4. Remove idler assembly.

5. To detach side rod ball studs from knuckle arms, insert Steering Ball Joint Remover HT72520000 between them and separate them.



ST595

Fig. ST-73 Removing Ball Joint

6. Install steering linkage in the reverse order of removal.

Ⓣ Tightening torque:
Ball stud

5.5 to 10.0 kg-m
(40 to 72 ft-lb)

Idler arm to body side frame

3.2 to 4.3 kg-m
(23 to 31 ft-lb)

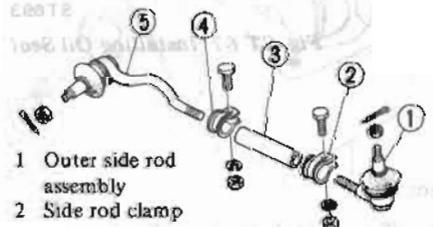
7. Check wheel alignment, and if necessary adjust. Refer to Section FA.

DISASSEMBLY

1. Remove both side rod, gear arm and idler arm from cross rod with Steering Ball Joint Remover HT72520000.

2. (1) Side rod

Loosen adjusting tube clamp, and remove outer and inner side rod sockets from adjusting tube.



- 1 Outer side rod assembly
- 2 Side rod clamp
- 3 Side rod adjusting tube
- 4 Inner side rod assembly

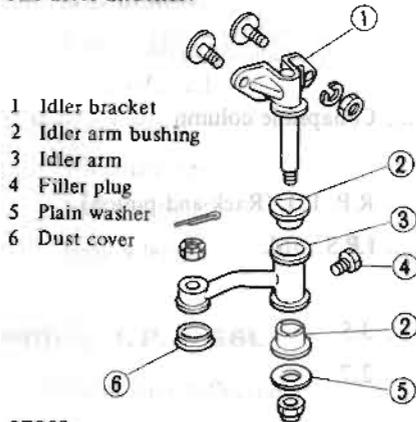
ST751

Fig. ST-74 Disassembly Side Rod

Steering System

(2) Idler arm

Loosen nut, and separate parts one after another.



ST869

Fig. ST-75 Disassembling Idler Arm

ASSEMBLY

Assemble steering linkage in the reverse order of disassembly, observing the following instructions.

Ball Joint

Ⓡ Tightening torque:

Ball stud
5.5 to 10.0 kg-m
(40 to 72 ft-lb)

Observe the following during ball joint assembly.

CAUTION:

- Be careful not to damage dust cover.
- Tighten nut to the specified torque, and align the cotter pin holes in the tightening direction.
- Be sure to insert new cotter pin and bend it securely.

Idler arm assembly

To assemble idler arm, proceed as follows:

- Apply coat of multi-purpose grease to bushing.
- Fit bushing into idler body, and insert shaft of idler arm bracket carefully until bushing protrudes.

Ⓡ Tightening torque:

Idler arm nut
5.5 to 10.0 kg-m
(40 to 72 ft-lb)

- Apply grease through grease nipple to idler joint of cross rod.

Note: Make sure sliding resistance of idler arm is less than 0.6 kg-m (4.3 ft-lb).

Cross rod and side rod

- When side rod sockets and side rod adjusting tube are separated, adjust side rod length correctly.

Adjustment should be done between ball stud centers.

Standard distance "A" between inner and outer ball stud centers:
366.3 mm (14.42 in)

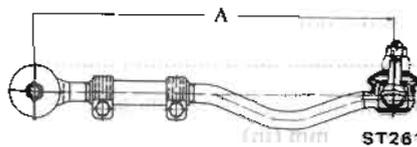
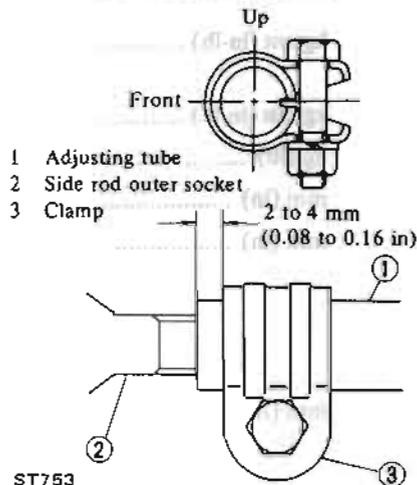


Fig. ST-76 Standard Side Rod Length

- Tighten adjusting tube lock nut with cross and side rods installed on car.

Note:

- Lock adjusting tube lock nut so that ball joint on outer socket (knuckle arm side) is 90° with respect to that on inner socket (cross rod side).
- Be sure to engage inner and outer sockets at least 35 mm (1.38 in) with adjusting tube.
- Make sure that clamp faces in direction shown in Fig. ST-77.
- Also make sure that clamp is held within 2 to 4 mm (0.08 to 0.16 in) from end of adjusting tube.



ST753

Fig. ST-77 Proper Installation of Clip

- Standard distance "A" is an approximate value to adjust toe-in described in Section FA.

Make sure that specified toe-in is obtained with cross and side rods installed on car.

Readjust if specified toe-in is not obtained.

INSPECTION AND REPAIR

Ball joint

- When ball stud is worn or axial play exists, replace side rod socket with a new one.
- When dust cover is broken or deformed, be sure to replace with a new one (rod assembly).

Initial swinging torque:

Ball joint

5 to 15 kg-cm
(4 to 13 ft-lb)

Idler arm assembly

Check rubber bushing of idler arm for breakage, wear or play, and if necessary replace.

Note: Apply grease to idler arm assembly at recommended intervals.

Cross rod and side rod

Check side rod and cross rod for breakage, bend or crack, and replace with a new one if necessary.

Fixing location

Check fixing location (nuts and cotter pins) for looseness, play or breakage. When looseness or play is found, check for wear on tapered portion of ball stud, gear arm or idler arm.

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Steering column	Collapsible column
Steering gear type	
Manual steering gear	R.P. 15L (Rack-and-pinion)
Power steering gear	I.P.S. 56L
Turns of steering wheel (Lock to Lock)	
R.P. 15L	3.5
I.P.S. 56L	2.7
Steering gear ratio	
R.P. 15L	19.6 : 1
I.P.S. 56L	16.3 : 1
Standard clearance between upper jacket head and lower jacket	
mm (in)	399.5 to 400.5 (15.73 to 15.77)

INSPECTION AND ADJUSTMENT

Front wheel turning angle		R.P. 15L	I.P.S. 56L
Inside	degree	33½° to 37½°	32° to 36°
Outside	degree	29° to 33°	24½° to 28½°
Steering wheel axial play			
Equipped with R.P.15L	mm (in)	0 (0)	
Equipped with I.P.S. 56L	mm (in)	0 (0)	
Steering wheel play			
Equipped with R.P. 15L	mm (in)	20 to 30 (0.79 to 1.18)	
Equipped with I.P.S. 56L	mm (in)	Less than 35 (1.38)	
MODEL R. P. 15L			
Side rod outer ball joint			
Swinging torque	kg-cm (in-lb)	3 to 50 (3 to 43)	
Side rod inner ball joint			
Swinging torque	kg-cm (in-lb)	0 to 50 (0 to 43)	
Pinion gear turning torque (Pinion gear and rack gear assembly)	kg-cm (in-lb)	Less than 20 (17)	
Rack force to pull	kg (lb)	Less than 10 (22)	
Side rod length	mm (in)	29.5 (1.161)	
Pinion bearing inner snap ring thickness	mm (in)	1.04 to 1.09 (0.0409 to 0.0429)	
		1.09 to 1.14 (0.0429 to 0.0449)	
		1.14 to 1.19 (0.0449 to 0.0469)	
		1.19 to 1.24 (0.0469 to 0.0488)	
		1.24 to 1.29 (0.0488 to 0.0508)	
Pinion bearing outer snap ring thickness	mm (in)	1.55 to 1.60 (0.0610 to 0.0630)	
		1.60 to 1.65 (0.0630 to 0.0650)	
		1.65 to 1.70 (0.0650 to 0.0669)	
		1.70 to 1.75 (0.0669 to 0.0689)	

Steering System

Steering gear retaining spring

Wire diameter	mm (in)	2.6 (0.102)
Free length	mm (in)	22.5 (0.886)
Load x Length	kg x mm (lb x in)	12.4 x 16.3 (27.3 x 0.642)

Side rod spring

Wire diameter	mm (in)	2.6 (0.102)
Free length	mm (in)	19.0 (0.748)
Load x length	kg x mm (lb x in)	40 x 17.0 (88 x 0.669)

MODEL I.P.S 56L

Oil pump belt deflection	mm (in)	8 to 12 (0.31 to 0.47) at 10 kg (22 lb)
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Steering wheel turning torque (at circumference of steering wheel)	kg (lb)	2.5 to 3.0 (5.5 to 6.6)
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Oil pump pressure	kg/cm ² (psi)	67 to 79 (953 to 1,123) at idling
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Backlash adjustment

Turning torque

- Center (As compared with steering wheel turned 360°)

kg-cm (in-lb)	1 to 4 (0.9 to 3.5) higher
---------------------	----------------------------
- 360° (When steering gear assembly alone is turned)

kg-cm (in-lb)	Less than 12 (10)
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Ball joint initial swinging torque	kg-cm (in-lb)	5 to 15 (4 to 13)
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Standard side rod length	mm (in)	366.3 (14.42)
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TIGHTENING TORQUE**STEERING COLUMN**

Steering wheel nut	kg-m (ft-lb)	4.0 to 5.0 (29 to 36)
Jacket tube bracket and cover to dash panel	kg-m (ft-lb)	0.35 to 0.45 (2.5 to 3.3)
Steering column mounting bracket	kg-m (ft-lb)	1.3 to 1.8 (9 to 13)
Coupling to column shaft (R.P. 15L)	kg-m (ft-lb)	1.7 to 2.0 (12 to 14)
(I.P.S. 56L)	kg-m (ft-lb)	1.5 to 2.2 (11 to 16)
Lower joint to rubber coupling (R.P. 15L)	kg-m (ft-lb)	2.3 to 2.7 (17 to 20)
Lower joint to pinion gear (R.P. 15L)	kg-m (ft-lb)	4.0 to 5.0 (29 to 36)
Stub shaft to coupling (I.P.S.)	kg-m (ft-lb)	3.3 to 3.9 (24 to 28)

STEERING GEAR AND LINKAGE**Model R.P. 15L**

Side rod to knuckle arm	kg-m (ft-lb)	5.5 to 10.0 (40 to 72)
Side rod lock nut	kg-m (ft-lb)	8.0 to 10.0 (58 to 72)
Gear housing clamp	kg-m (ft-lb)	4.6 to 6.1 (33 to 44)
Retainer lock nut	kg-m (ft-lb)	4.0 to 6.0 (29 to 43)
Side rod inner socket lock nut	kg-m (ft-lb)	8.0 to 10.0 (58 to 72)

Model I.P.S. 56L

Oil pump to bracket	kg-m (ft-lb)	1.9 to 2.6 (14 to 19)
Gear arm nut	kg-m (ft-lb)	13 to 15 (94 to 108)
Steering gear housing to body	kg-m (ft-lb)	5.3 to 6.3 (38 to 46)
Sector shaft adjusting screw lock nut	kg-m (ft-lb)	2.9 to 3.5 (21 to 25)
Hose to oil pump	kg-m (ft-lb)	3.0 to 7.0 (22 to 51)
Bleeder screw	kg-m (ft-lb)	0.7 to 0.9 (5.1 to 6.5)
Sector cover bolt	kg-m (ft-lb)	2.7 to 3.3 (20 to 24)
Rear housing bolt	kg-m (ft-lb)	2.7 to 3.3 (20 to 24)
Idler body to frame	kg-m (ft-lb)	3.2 to 4.3 (23 to 31)
Ball stud nuts	kg-m (ft-lb)	5.5 to 10.0 (40 to 72)
Side rod adjusting tube clamp nuts	kg-m (ft-lb)	1.4 to 1.7 (10 to 12)
Idler arm nut	kg-m (ft-lb)	5.5 to 10.0 (40 to 72)
Hose to gear housing	kg-m (ft-lb)	5.0 to 7.0 (36 to 51)

TROUBLE DIAGNOSES AND CORRECTIONS

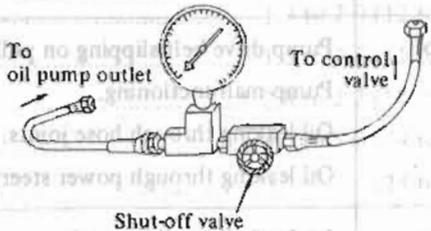
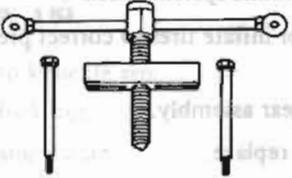
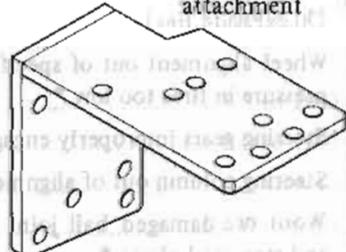
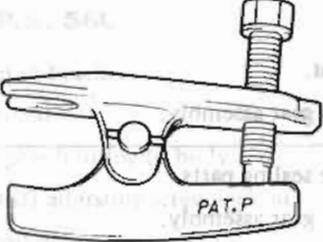
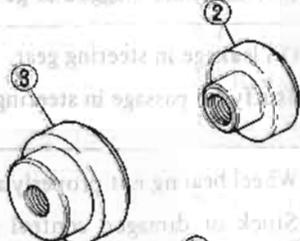
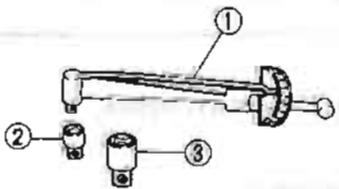
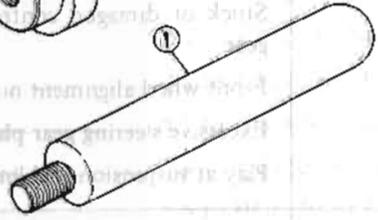
MANUAL STEERING

Refer to TROUBLE DIAGNOSES AND CORRECTIONS in "Front Axle & Front Suspension" Section.

POWER STEERING

Condition	Probable cause	Corrective action
Oil pressure does not build up.	Pump drive belt slipping on pulley. Pump malfunctioning. Oil leaking through hose joints. Oil leaking through power steering.	Readjust belt tension. Replace. Replace or retighten copper washer. Replace sealing parts at steering gear.
Steering wheel moves heavily.	Lack of oil in oil pump.* Air present in oil. Oil pressure too low. Wheel alignment out of specifications or air pressure in tires too low.* Steering gears improperly engaged.* Steering column out of alignment.* Worn or damaged ball joint at suspension and steering linkage.* Idler arm dragging.*	Refill. Bleed air. See "Hydraulic system check". Re-align or inflate tires to correct pressure. Replace gear assembly. Repair or replace. Replace. Repair or replace.
Steering wheel fails to return.	Refer to items marked "*" above. Front wheel caster improperly adjusted. Internal gears dragged or gouged.	Readjust. Replace gear assembly.
Steering effort is not the same in both directions.	Oil leakage in steering gear. Stuffy oil passage in steering gear.	Replace sealing parts. Replace gear assembly.
Unstable running.	Wheel bearing not properly adjusted. Stuck or damaged control valve in steering gear. Front wheel alignment not properly. Excessive steering gear play. Play at suspension and linkage ball joint.	Readjust. Replace gear assembly. Readjust. Readjust backlash or replace gear assembly. Replace.
Noisy pump.	Lack of oil in oil pump. Hoses or oil filter clogged. Loose pulley. Belt noisy or slapping. Broken pump part.	Refill. Clean or, if necessary, replace. Repair. Readjust tension. Replace.

SPECIAL SERVICE TOOLS

Tool number & tool name	Kent-Moore No. Reference page or Fig. No.	Tool number & tool name	Kent-Moore No. Reference page or Fig. No.
ST29020001 Steering gear arm puller 	J 25725 Fig. ST-15 Page ST-10 Page ST-15 *	ST27091000 Pressure gauge 	Fig. ST-28 I.P.S. 56L
ST27180001 Steering wheel puller 	J 25726 Fig. ST-3 *	KV48100300 Steering gear housing attachment 	J 25729 Fig. ST-52 Fig. ST-58 Page ST-14 I.P.S. 56L
HT72520000 Steering ball joint remover 	— Fig. ST-23	KV481009S0 Oil seal drift set ① KV48100910 Drift ② KV48100920 Adapter ③ KV48100930 Adapter 	J 26367 Fig. ST-41 Fig. ST-42 Fig. ST-51
ST3127S000 Preload gauge ① GG91030000 Torque wrench ② HT62900000 Socket adapter ③ HT62940000 Socket adapter 	See J 25765 Fig. ST-19 I.P.S. 56L		I.P.S. 56L

*Applicable to all S130 series models